DISPLAY DEVICE WITH A FOCUS BUOY FACILITY

Technical field

The invention relates to the data processing systems wherein a plurality of windows corresponding to a plurality of application programs being executed simultaneously may be displayed at the same time, and relates in particular to a display device with a focus buoy facility.

Background art

10   Today data processing systems have multiwindow functions to perform a simultaneous processing of a plurality of processes under the control of a plurality of application programs.

The conventional multiwindow control method as described in JP-A-60,205,492 and JP-A-57,125,989 provides a scheme to discriminate visible windows. In such a method, a window to
15   which data can be input or a current window is distinguished on the screen from a non-current window (wherein data cannot be input) by using a different brightness or luminance or by

highlighting the data of the current window. However, a case where a window is completely covered by other windows and becomes invisible to the operator has not been considered in these patent applications. US 5,179,655 provides a multiwindow control method an apparatus to process a window concealed by other windows when a plurality of windows are generated on the screen of a workstation. Namely, there is being provided a window display area taking precedence over all other display areas so that during operations of generating a new window or altering the window size of a beforehand generated window, etc..., any concealed window becomes represented by an icon placed in such window display area that an operator may recognize and identify as the concealed window.

However, it has not been considered, according to the prior art technology above, that a work station screen becomes very often hardly readable because the window display area taking precedence over all other display areas is rapidly filled with icons representing concealed windows. It becomes difficult for the operator to retrieve a particular concealed window of interest, especially given the necessary small size of icons. And yet, at any given time, an operator very frequently has a particular application associated to a particular window, which he considers to be the "main application at such time", and which he would like to be able to retrieve rapidly from any secondary applications and windows.

Summary of the invention

Accordingly, the object of the invention is to provide a data processing system wherein the display device is equipped with a focus buoy facility enabling the user to focus easily any window amongst a plurality of windows displayed at the same time on the screen.

The invention relates therefore to a data processing system comprising at least a processing unit capable of executing simultaneously a number of application programs, a memory for storing the application programs, a display subsystem for displaying on a screen a plurality of windows associated respectively with a plurality of application programs, each window being able to overlay partially or totally one or several windows already displayed on the screen, and a mouse for moving a cursor to a selected location of the screen. The display subsystem comprises first displaying means for displaying on the screen a focus buoy associated with each window at the same time the window is displayed on the screen, a table in the memory for storing for each window the coordinates of the location at which is displayed the buoy associated with the window, second displaying means for displaying a buoy at each location defined in the table in response to simply shaking of the mouse, whereby the user of the system may click any one of the displayed buoys in order to get the focus of the associated window.

Brief description of the drawings

The present invention will be apparent from the following detailed description taken in conjunction with the accompanying drawings wherein :

Fig. 1 is a block-diagram of a data processing system wherein the invention is implemented.

Fig. 2A-2D are schematic representations of the screen where a first window is displayed, a second window overlying the first window is displayed, a third window overlying the second window is displayed, and of the screens with the focus buoys after shaking the mouse.

Fig. 3 is a flowchart representing the different steps implemented by the display device according to the invention when a focus buoy is involved.

Detailed Description of the Invention

The invention is implemented in a data processing system illustrated in Fig. 1 comprising at least a processing unit 10 able to execute simultaneously a plurality of application programs 12 stored in a memory 14, a screen 16 on which can be displayed a plurality of windows corresponding to the application programs being executed at the same time and a mouse 17 for moving the cursor on screen 16. A display subsystem 18 comprising the control means necessary to manage the data to be displayed and wherein are implemented the features of the invention is interconnected between processing unit 10 and screen 16. Each time a window is displayed on screen 16, a focus buoy is also displayed and data related to the displayed buoy are registered in a table 20 stored in memory 14. The data registered for each window are at least the identification of the application program (AP) involved, a pointer to the corresponding window, and the location of the focus buoy by the indication of the row (r) and the column (c) of the starting edge of the buoy. Thus, assuming that three windows are successively displayed on the screen, the entries W_1, W_2, W_3 of the table are the following :

W_1	AP_1	pointer 1	r_1, c_1
W_2	AP_2	pointer 2	r_2, c_2
W_3	AP_3	pointer 3	r_3, c_3

The principles of the invention are now explained in reference to Fig. 2A-2D. In Fig. 2A, a first window 22 corresponding to a first application program is displayed on screen 16. A focus buoy 24 is also displayed at the right of a row located at the top of the window. It must be noted that the buoy might be displayed at any location of the window and even beside the window.

Then, as illustrated in FIG. 2B, a second window 26 corresponding to a second application program and overlying

partially the first window 22 is displayed on screen 16. A
focus buoy 28 is also displayed at the top of the window as
for the first window.

In reference to FIG. 2C, a third window 30 corresponding to a
third application program and overlying partially the first
and the second windows 22 and 26, is then displayed on screen
16. At the same time a focus buoy 32 is displayed at the top
of the window 30.

As already mentioned, data associated with each window being
displayed, such as a pointer to the window and the location of
the focus buoy, are registered in an entry of table 20 in
memory 14. It must be noted that an alternative location (row,
column) can be also registered for each focus buoy further to
the real location. Such a location could be useful if it
happens that the buoy for an overlying window has the same
location as the focus buoy corresponding to the window which
is overlaid.

Assuming that the user wants to focus one of the windows 22
and 26 which are overlaid and not visible, he needs only to
shake the mouse to get the displaying of all the focus buoys
as illustrated in Fig. 2D. Then, he can get the focus of any
window by clicking on the focus buoy associated with the
selected window. Such a result is easily obtained since the
operation of the mouse at this time is properly interpreted by
processing unit 10 which sends a command to display subsystem
18 for it to display all the focus buoys the locations of
which or their alternative locations are registered in table
20. Note that, in the preferred embodiment illustrated in Fig.
2D, the windows are removed as soon as the mouse is shaken.
However, an alternative way would be to display the focus
buoys above the windows without removing them.

As illustrated in Fig. 2D, another alternative is to display simultaneously with each focus buoy, a little window such as windows 34, 36 and 38 respectively associated with focus buoys 24, 28 and 32, containing a title related to the corresponding

5   window. Thus, the user will be able to identify rapidly the selected window even if there are many windows already opened on the screen.

Fig. 3 illustrates the flow chart of the commands performed by the display device 18 when a message relating to a focus buoy

10   is involved. First of all, a system message is received (step 40) by the display device. It is checked whether this message relates to a focus buoy (step 42). If not, the process loops back to the beginning. If it is a focus buoy message, it is checked whether the message corresponds to a new window (step

15   44). If so, a focus buoy is associated with the new window by registering data as mentioned above in an entry of table 20 (step 46) and then the process loops back to the beginning.

When the message does not correspond to a new window, it is determined whether the mouse 17 has been shaken (step 48). If

20   so, this means that the user wants to select a window which is not visible and the buoys are all displayed (step 50) as already described in reference to Fig. 2D. Note that little windows containing the titles of the windows may be displayed simultaneously with the buoys as already mentioned.

25   When the focus buoys are displayed, an alternative consists in shacking again the mouse to remove the buoys when the user wants no longer to have the buoys displayed. It is therefore checked whether the mouse is again shaked (step 52) and if so, the buoys are removed from the screen (step 54). After

30   removing the buoys or if the mouse is not shaked again, the process loops back to the beginning.

If the mouse has not been shaken, it is determined whether a focus buoy is clicked (step 56) to select a window. If so, the associated window is activated (step 58) before the process returns to the beginning. If no focus buoy is being clicked, the last possibility is to check whether an opened window is to be closed (step 60). If so, the entry of table 20 corresponding to this window is removed from the table (step 62). After that, the process returns to the beginning. It must be noted that, if the message does not relate a window closing, it corresponds to an erroneous message which is discarded (step 64).